REMARKS

Claims 1-27 are pending in the present application. Claims 1 and 18 have been amended. Claims 6, 7,14, 16 and 20 have been cancelled. In view of the foregoing amendments and the following remarks, Applicants respectfully request reconsideration of the present Application.

The Examiner has rejected Claims 1-12, 14, 15, 18-21 and 23-27 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,173,457 by Shorthouse. Applicants respectfully traverse this rejection.

Independent Claim 1 has been amended herein to incorporate the limitations of Claims 7 and 14. Claim 1 is directed to a powder batch comprising complex glass particles that are substantially spherical and have an average size of not greater than about 10 μm. The glass particles have a particle density of at least about 95 percent of the theoretical density and include no greater than about 0.1 atomic percent impurities.

Shorthouse discloses a paste composition that includes a dielectric component of substantially spherical particles having a particle size below 5 μm. The particles are preferably produced by a sol-gel technique, such as the hydrolysis of a mixture of the appropriate alkoxides to form a sol, which is redispersed in water and sprayed.

The Examiner states that the particles disclosed by Shorthouse "may be heated to form porosity in the particles and subsequent heating further causes the particles to coalesce to decrease the porosity and form a glass material." The Examiner then concludes that this disclosure indicates that "the particle density is close to the theoretical density." The Examiner further states that Example 1 of Shorthouse indicates that the dielectric component is a borosilicate having 20% boron and 80% silicon as oxides. The Examiner concludes from this disclosure that Shorthouse meets "the limitation . . . that the particles comprise no greater than 0.1 atomic percent of impurities."

In order to anticipate a claim, a reference must expressly or inherently describe each and every element as set forth in the claim. Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP § 2131. Applicants respectfully submit that Shorthouse does not expressly or inherently describe each and every element of Claims 1-12, 15, 18-21 and 23-26.

Currently amended independent Claim 1 require that the glass particles have impurities of no greater than 0.1 atomic percent. Shorthouse does not disclose any glass particles having such a low level of impurities. The Examiner refers to language in Example 1 of Shorthouse for the proposition that the glass particles comprise no greater than 0.1 atomic percent impurities. The language in Example 1 states "the resulting powder is a borosilicate of *approximate* composition 20% boron and 80% silicon, as oxides, and having a particle size in the range of 0.1 to 5 μm." (Col. 5, lines 50-52) Shourthouse does not make reference to the level of impurities in the particles.

It is submitted that the particles disclosed by Shorthouse also do not inherently possess an impurity level of not greater than 0.1 atomic percent. Indeed, it is likely that the particles of Shorthouse include at least some impurities. It is disclosed at Col. 3, lines 54-57:

> "The particles lose volatile material on heating to about 150°C. Heating to about 350°C causes the particles to lose organic materials and form significant porosity...."

As is known to those skilled in the art, the burnout of organics typically leaves impurities in the material, such as carbon.

Claim 1 has also been amended to recite that the particle density is at least about 95 percent of the theoretical density. Shorthouse does not expressly disclose particles having such a high density. It is submitted that Shorthouse also does not inherently disclose particles having such a high density. At Col. 3, lines 55-62:

> "Heating to about 350°C causes the particles to lose organic materials and form significant porosity, the pore diameter being in the region of 4 to 10 angstrom (0.4 to 1 nanometres). Further heating to temperatures in the range 600° to 1100°C causes the particle porosity to decrease substantially and the individual particles to coalesce to form a glass or ceramic material."

Thus, the particles initially include "significant" porosity and heating to higher temperatures causes the porosity to "decrease substantially." However, it is respectfully

submitted that such heat treatment would not be sufficient to increase the density from "significant" to at least 95 percent of the theoretical density. It is submitted that a heating temperature that is sufficiently high to cause a glass to flow sufficiently to cause the particle to approach the theoretical density, would also be high enough to cause excessive coalescence of the particles such that individual particles would fuse together and the resultant average particle size would increase dramatically. Therefore, Shorthouse does not inherently disclose particles having a density of at least 95 percent of the theoretical density.

In view of the foregoing, Applicants request reconsideration of Claim 1 and Claims 2-5, 8-13, 15 and 17, which depend upon Claim 1.

Currently amended independent Claim 18 includes the limitations that the average particle size is from about 0.1 μm to about 5 μm and that at least about 80 weight percent of the glass particles are not larger than twice the average particle size. Further, Claim 18 has been amended to recite that the density of the particles is at least about 95 percent of the theoretical density. Shorthouse does not expressly disclose glass particles having such a high density. As is discussed above with respect to Claim 1, it is submitted that Shorthouse also does not inherently disclose particles having such a high density, particularly in conjunction with the recited average particle size and the recited narrow size distribution. As is discussed above, Shorthouse admits that to increase the density of the particles, they must be heated. It is submitted that in accordance with the method of Shorthouse, to heat glass particles to a sufficient temperature to achieve at least 95 percent of the theoretical density would also result in coalescence of the particles and a resultant increase in the average particle size and skewing of the particle size distribution. For these reasons, it is submitted that currently amended Claim 18 is not anticipated by Shorthouse and removal of this rejection with respect to Claim 18 and Claims 19 and 21-27 is requested.

The Examiner has rejected Claims 1-5, 8-15, 17-19 and 21-27 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,567,030 to Yuasa et al. In view of the foregoing amendments, incorporating the limitation of Claim 7 into independent Claim 1 and incorporating a limitation encompassing the limitation of Claim 20 into Claim 18, removal of this rejection is requested.

The Examiner has rejected Claims 1 and 16 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,849,055 to Arai et al. The Examiner states that Arai et al. disclose inorganic microballoons (hollow spheres). The Examiner further states that Arai et al. disclose an average particle size of at most 1 micron, which meets the particle size limitation of Claim 1.

In view of the amendment to independent Claim 1 incorporating the limitation of Claim 7 that the density is at least 95 percent of the theoretical density, removal of this rejection is requested. Claim 16 has been cancelled.

Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Applicants hereby request a two-month extension of time under 37 CFR §1.136(a) extending the period for response to February 19, 2003 and the appropriate fee accompanies this response. It is believed that no additional fees are owed, however any such additional fees can be charged to Deposit Account 50-1419. Should the filing of this response require an additional extension of time under 37 C.F.R. § 1.136(a), such extension is requested and any deficiency in payment of extension fees should be charged to Deposit Account 50-1419.

Respectfully submitted,

MARSH FISCHMANN & BREYFOGLE LLP

By: 

David F. Dockery
Registration No. 34,323
3151 South Vaughn Way, Suite 411
Aurora, Colorado 80014
Telephone: 303-338-0997
Facsimile: 303-338-1514

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